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ABSTRACT

This study examined how middle science teachers perceive the textbooks they use and how their perceptions varied with their personal attributes and professional backgrounds. A questionnaire was sent to 79 middle school science teachers in Missouri, and 66 responded. The questionnaire was designed to determine the teachers' perceptions about the quality, usability, and congruency of their respective textbooks. The data indicated a general positive acceptance by the teachers towards their textbooks. However, 30 percent did not feel that their current textbook was congruent with the state-mandated objectives. About 25 percent of respondents thought their text book did not provide activities that encouraged the student-as-the-worker or provided for active learning. It also appeared that teachers who had attended a national science conference within the previous 3 years approached their curriculum more critically. Teachers who were involved in a team plan tended to have a more positive outlook on their textbook's ability to provide a proper mix of lower and higher order questions. Also, female teachers appeared to be less critical of their textbook and less confrontational about district policy issues. Overall, the research indicated that teachers who participated in professional conferences were more critical and more aware of the needs of the learner. The appendix contains the survey instrument and data tables. (Contains 16 references.) (JB)

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ED 389 696

MIDDLE SCHOOL SCIENCE TEACHERS' PERCEPTION OF TEXTBOOK CONGRUENCY WITH CLASSROOM NEEDS

A Research Report Presented at the Missouri Unit of the Association of Teacher Educators (MUATE) Conference
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Middle School Science Teachers' Perception of Textbook Congruency with Classroom Needs

Current educational thought condemns a textbook-driven curriculum, not because textbooks are inherently bad, but because most do not meet the needs of a district's curriculum. However, the dominant influence of the textbook cannot be overlooked as a significant force in the restructuring movement; and the reality is that many teachers incorporate the textbook as the legitimate curriculum. Schubert (1991) and Weiss (1987) found that textbook use accounts for more than 90 percent of the instructional time in schools. Blystone estimates that 75 percent of biology classroom time and 90 percent of homework time involve the use of textbooks (as cited in Jablon, 1992, p. 72). As Eisner (1987) states, "The textbook not only defines a substantial proportion of the content, sequence, and aims of the curriculum it also influences the way in which certain topics will be regarded" (p. 12).

Several researchers have voiced concerns over textbook use and content. The National Research Council's Committee on High School Biology Education (NRC 1990) noted that "most available texts are poor" (p. 106). Sinatra and Dole (as cited in Driscoll et al., 1994) found problems of both content coverage and explanatory coherence in science texts that impeded student understanding. Most often, concern is expressed over the content and comprehensibility of texts (Driscoll, et al., 1994).

Roth (1985) reports that both good and poor readers had difficulty learning from science texts because they use ineffective text processing strategies. Only students using conceptual change strategies were successful in giving up or modifying their incorrect prior knowledge in favor of the textbook explanation. Eylon and Linn (1989)

assert that the vocabulary found in one week's worth of science lessons often exceeds the vocabulary found in a six week foreign language unit.

Many educational researchers have focused on the emphasis of science texts on the instruction and the finished product of scientific fact (Stinner, 1992). Pizzini, Shepardson and Abell (1994) reviewed a selection of the most commonly used middle school science textbooks by discipline and found them to be dominated by input level questioning. Driscoll (1994) found science textbooks tended to employ few instructional strategies to support higher level objectives; in fact, Driscoll, et al., (1994) found that the predominate use of the textbook (due to the emphasis on vocabulary acquisition) was as a dictionary.

Some researchers believe publishers' priorities contribute to textbook weaknesses. Most textbook companies strive to meet the mandated objectives of those states where their largest market is located and often bow to the pressures of special interest groups (Tanner, 1993). Sensitive issues are frequently overlooked or avoided by textbook publishers seeking a larger market. As Eisner (1987) states, "Stockholders' investments are not to be jeopardized in the service of education" (p.13).

In spite of the abundance of research addressing the content and emphasis of science textbooks, as well as how teachers use these texts (Renner et al., 1990; Yore, 1991; Gottfried & Kyle, 1992;), there appears to be a void in the research related to science teachers' perceptions of the textbook. Little research has focused on the teachers' views of the textbook in terms of its ability to encourage critical thinking and facilitate the processing of information.

Missouri, like many states, has legislated school reform that calls for all students to master specific performance standards. These standards are process-centered, and are essentially designed to encourage schools to provide students will skills to use information to solve problems, make decisions, and develop life-long learning habits. The current criterion-referenced state test will eventually be replaced with a more complex system that requires students to exhibit higher order thinking abilities. Are middle school science textbooks providing material and activities that offer adequate resources in the classroom? Do middle school science teachers in Missouri have a perception of textbooks that are congruent with these state aims? What characteristics of middle school science teachers influence the way in which they perceive the congruency of their chosen textbook with the actual needs of their students?

Statement of the Problem

Middle school science teachers in Missouri use a variety of science textbooks. Because Missouri does not adopt textbooks on a state-wide level and does not mandate any specific curriculum scope and sequence, the curriculum found in any one middle school could be quite different from another. The purpose of this study was to identify how middle science teachers perceive the textbooks they use. This study also investigated the relationship between certain personal attributes of middle school science teachers (sex) and professional backgrounds (level of education, national conference experience, and team planning with their own school) and their perceptions of their textbooks.

Specifically, the following research questions were addressed:

1. What is the general perception of middle level science teachers regarding the efficacy of middle level science textbooks?

2. Are differences in perception related to the science teachers' involvement in national science conventions?

3. Are differences in perception related to the science teachers' involvement in a team planning period with other academic middle school teachers?

4. Are differences in perception related to attainment of advanced degrees by middle school science teachers?

5. Are differences in perception related to the number of years of teaching experience by middle school science teachers?

6. Are differences in perception related to the sex of the teacher?

Limitations and Delimitations

The study was confined to only those middle schools included in a 60 mile regional area of state university. Respondents were not all using the same textbook. Therefore, the results should be of a relationship value -- not a predictive one.

Methodology

A researcher-developed 17 item five-point Likert-type questionnaire (Strongly Agree, Agree, No Opinion, Disagree, Strongly Disagree) was sent to 79 middle school science teachers who teach in schools that are served by a regional state university. Sixty-six (66) responded (return rate of 83.5%). The questionnaire was designed to determine the teachers' perceptions about the quality, usability, and congruency of their respective textbook. A biographical/professional background form provided additional information about the teachers': (a) level of education, (b) attendance at

national conferences, (c) team Planning experience in their schools, (d) Sex, and (e) number of years teaching.

Findings of the Study

The first question addressed the general perception of the efficacy of middle level science textbooks by the science teachers who use them. That information is presented in Table 1.

- Insert Table 1 Here -

As indicated from the table, the majority of the teachers perceived that their individual textbooks provided adequate coverage of the areas identified in the questionnaire. There were four areas that received positive responses from most of the teachers (agreed or strongly agreed): (Item 1) The textbook provided appropriate coverage of the information (62%), (Item 5) The textbook was written at the appropriate level (66%), (Item 12) The textbook provided activities congruent with the learning characteristics of middle school students (72%), and (Item 13) The textbook provided appropriate terms for the students (68%). There were three areas where the teachers appeared to be most negative (disagreed or strongly disagreed): (Item 3) Congruency with state-mandated objectives (30%), (Item 10) The textbook provided activities that encouraged the student as a worker (28%), (Item 16) The textbook provided opportunities for active learning (hands-on) (24%).

The second question focused on the differences in science teachers' involvement in national science conventions and their perceptions of their textbooks. That

information is presented in Table 2.

- Insert Table 2 Here-

Examination of the data reveals a statistically significant difference (.01) in Item 12 - "The science textbook used for my class provides activities that are congruent with the learning characteristics of a middle school student. Those teachers who attended national conventions (M=3.4) perceived this as a weakness compared to those teachers who had not attended national conventions (M=3.9).

The third research question addressed the differences in perception related to the science teachers' involvement in a team planning period with other academic middle school teachers. That information is presented in Table 3.

- Insert Table 3 Here-

As these data indicate, those teachers who participated in team planning had a more positive perception of their textbooks than those teachers who had no team planning opportunities. In fact, the teachers involved in team planning rated 15 of the 17 items higher than the other group. Item 4 - "The science textbook used for my class offers the proper ratio of information/knowledge content and higher order conceptual material" was statistically significant at an alpha level of .05.

The fourth research question addressed the differences in perception related to the science teachers' level of education. These levels were stratified by those teachers who had bachelors degrees and those teachers who had advanced degrees

(MSEs). This information is presented in Table 4.

- Insert Table 4 Here-

The data indicate no statistically significant difference between the two groups on any of the 17 items of the questionnaire.

Question number five addressed the relationship between perception of the science textbook and the number of years of teaching experience. The years of teaching variable was stratified into three groups (1-4 years), (5-10 years) and (11+ years). These groups were created arbitrarily to produce a relatively equal number of subjects per group. An Analysis of Variance (ANOVA) was used to treat the data. This information is presented in Table 5.

-Insert Table 5 Here-

As the data indicate, there are not significant differences among the three teaching groups. No pattern is evident to indicate that the years of teaching is related to the way a middle school science teacher perceives the quality of a textbook.

Question number six address the relationship between the sex of the teacher and his/her perception of the textbook quality. That information is presented in Table 6.

-Insert Table 6 Here-

With the exception of Item 1 - "The science textbook used for my class provides

appropriate coverage of the areas specified by the district curriculum" (.04), there appears to be no relationship between the sex of the middle school science teacher, and his/her perception of the quality of the textbook.

Conclusions

The present study sought to provide insight on six research questions. Although no definite generalizations can be inferred from such a regional population, the results do provide some interesting data. Question one queried, "What is the general perception of the efficacy of middle level science textbooks by the middle level science teachers?" The data indicate a general positive acceptance by the teachers towards the textbook used. However, 30 percent of the respondents did not feel that their current textbook was congruent with the state-mandated objectives. Since most textbook companies strive to meet the mandated objectives of those states where their largest market is located (Tanner, 1993), it is not surprising that teachers would respond in the negative. Missouri does not adopt a statewide textbook.

The ability of the textbook to provide activities that encouraged the student-as-the-worker (28%) and provide for active learning (24%) was also viewed in a negative manner by a some teachers. It is interesting that approximately 25 percent of the teachers viewed their textbooks in a negative fashion in this regard. Driscoll (1994) found science textbooks to lacking in strategies to support higher order thinking and active learning. He further suggests that most science textbooks were being used predominately as dictionaries by teachers. Eylon and Lynn (1989) concur as they assert that the vocabulary found in one week's worth of science lessons often exceeds the vocabulary found in a six week foreign language unit.

A variety of comments were given by the respondents in the open response section of the questionnaire. Several comments provide further insight into how middle school science teachers view usability of the text. One teacher comments, "We teach a mix of life, physical, and earth science in both 7th and 8th grades - I teach out of three textbooks. It is sometimes difficult to find material related to a certain subject in just one book. Another comment, "The textbook I have is pretty traditional - the reading level is difficult - heavy on information rather than process."

Question two queried, "Are differences in perception related to the science teachers' involvement in national science conventions?" To the questionnaire item stating, "The science textbook used for my class provides activities that are congruent with the learning characteristics of a middle level school student," teachers who had attended a national science conference within the last three years responded differently than those who had no conference experience (statistically significant) It can be inferred that teachers engaged in professional organizations and conferences are more likely to possess the knowledge base needed to critically analyze curriculum. A comment given by a teacher who had attended a conference states, "No textbook provides what the teacher can add to the lessons. I use a lot of other resources to develop and get across the concepts in each lesson."

Question three investigated the link of middle school science teachers with a core academic team planning period to those with only individual planning periods. Teachers who had a team plan tended to provide a more positive outlook of their textbook's ability to provide a proper mix of lower and higher order questions. The correlation matrix data indicate that the larger schools tend to have more experienced

teachers and more teachers with advanced degrees. It is inferred that the larger schools are able to provide more financial resources and a more sophisticated organizational structure. The data infer the possibility that the larger schools are able to provide more extensive textbook selection process and purchase the more expensive, comprehensive textbooks to meet the demands of a selection committee.

Question five investigated the relationship between years of experience and textbook perception. Years of teaching was stratified into three groups (1-4 years), (5-10 years) and (11+ years). These groups were arbitrarily created to produce a relatively equal number of subjects per group. No relationships were evident. This raises a variety of questions. Do experienced teachers not have a more critical view of textbooks? Do experienced teachers have better skills in using the textbook to elicit activities that meet the needs of the students? Or, do experienced teachers and less experienced teachers generally accept the textbook as the legitimate curriculum in the classroom? The data indicate a general acceptance of the textbooks used. The literature provides for quite a different perpective.

Schubert (1991) and Weiss (1987) found that textbook use accounts for more than 90 percent of the instructional time in schools. Pizzini, Shepardson, and Abell (1994) reviewed a selection of the most commonly used middle school science textbooks by discipline and found them to be dominated by input level quesitoning. It is likely that most practicing middle level science teachers are using their textbooks as the legitimate curriculum and seldom question the textbook's ability to meet the needs of the learner.

Question six investigated the relationship between sex of the teacher and

perception of textbook quality. A statistically significant difference was found in response to item one of the questionnaire - "The science textbook used for my class provides appropriate coverage of the areas specified by the district curriculum." It could be inferred that the female teachers tend to be less critical in comparisons or are less confrontational about district policy issues.

Implications

This research provided the beginnings of a trek to determine if the textbooks used in Missouri middle school science classrooms are, in reality, meeting the needs of the middle school students. The difficult component of this task is determining what is reality. Each teachers' perception of the reality of the textbook to meet the needs of the student differ. Further research needs to be developed that would compare teachers' perceptions of a specific textbook with an independent professional audit of the text.

The present research does provide positive support to the generally held belief that teachers who participate in professional conferences are likely to become more critical and more aware of the needs of the learner. It reaffirms that interaction with other professionals at a national level does increase the teachers awareness of the professional knowledge base. The more networking that occurs - the closer the teachers' perception will mirror reality.

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APPENDIX

Survey Instrument and Tables

SCIENCE TEXTBOOK AND RESOURCE SURVEY

A survey to identify the current perceptions of middle school science teachers regarding the classroom textbook

This survey is designed to gather data which should help the Department of Curriculum and Instruction at Central Missouri State University in developing opportunities that could assist the practicing classroom teacher. Your help will be appreciated and your thoughtful responses important.

* * * \

SCIENCE TEXTBOOK AND RESOURCE SURVEY

Please carefully read the following statements. A (5) five represents that you strongly agree with the statement. A (1) represents that you strongly disagree with the statement. Use (2) two through (4) four to represent the degree of agreement or disagreement. For example, a (3) three would represent a somewhat neutral stance on the statement. If you teach more than one science class, please choose the class in which you have the most experience when answering the following questions. Thanks in advance for your assistance.

Please note that this is a confidential and totally anonymous survey. There is no mechanism contained to identify schools or individuals.

1. The science textbook used for my class provides appropriate coverage of the areas specified in the district curriculum.
   1 2 3 4 5
2. The science textbook used for my class provides adequate materials for active student learning opportunities.
   1 2 3 4 5
3. The science textbook used for my class is congruent with state curriculum frameworks.
   1 2 3 4 5
4. The science textbook used for my class offers the proper ratio of information/ knowledge content and higher order conceptual material.
   1 2 3 4 5
5. The science textbook used for my class is written at the appropriate level for my students.
   1 2 3 4 5
6. Due to inadequate coverage by the textbook I frequently substitute materials and/or information.
   1 2 3 4 5
7. Due to the absence of material in the textbook I frequently must add or create material for my class.
   1 2 3 4 5
8. The science textbook used for my class provides current examples of how various science concepts function in society and the workforce.
   1 2 3 4 5

9. The science textbook used for my class provides activities that encourage the student to use critical thinking skills.

1 2 3 4 5

10. The science textbook used for my class provides activities that encourage the student to become the worker and the teacher to become the facilitator.

1 2 3 4 5

11. The science textbook used for my class provides information on resources that could be used to enrich text material.

1 2 3 4 5

12. The science textbook used for my class provides activities that are congruent with the learning characteristics of a middle school student.

1 2 3 4 5

13. The science textbook used for my class provides the proper amount of terminology for the student to achieve understanding.

1 2 3 4 5

14. The science textbook used for my class provides an excessive amount of recall/knowledge type of information.

1 2 3 4 5

15. I am pleased with the science textbook used for my class.

1 2 3 4 5

16. The science textbook used for my class provides opportunity for active learning (hands-on) in the classroom.

1 2 3 4 5

17. The science textbook used for my class provides opportunity for cooperative learning activities in the classroom.

1 2 3 4 5

COMMENTS:

Table 1

Middle School Science Teachers Perceptions of Textbook Quality

Survey Items (N=66)	M	SD	Responses 1 %a	2 %	3 %	4 %	5 %
1. Appropriate coverage	3.7	1.1	05%	11%	23%	35%	27%
2. Adequate materials	3.7	1.2	02%	20%	18%	30%	30%
3. Congruency with state	3.2	1.2	09%	21%	24%	29%	17%
4. Know. level balance	3.6	1.1	05%	15%	20%	42%	18%
5. Appropriate age level	3.8	1.0	03%	06%	24%	39%	27%
6. Substitute materials	3.4	1.3	06%	26%	15%	26%	27%
7. Add or create materials	3.3	1.3	09%	27%	09%	32%	23%
8. Provides examples	3.6	1.1	03%	15%	23%	39%	20%
9. Critical Thinking skills	3.5	1.1	03%	15%	26%	38%	18%
10. Student as a worker	3.2	1.1	08%	20%	27%	33%	12%
11. Resource materials	3.6	1.0	02%	17%	21%	41%	20%
12. Learning characteristics	3.7	1.0	02%	08%	29%	45%	17%
13. Appropriate Terms	3.8	1.0	03%	08%	21%	41%	27%
14. Excessive recall	3.2	1.1	09%	18%	29%	35%	09%
15. Satisfaction with text	3.5	1.1	03%	117%	27%	35%	18%
16. Hands-on activities	3.5	1.1	04%	220%	23%	33%	21%
17. Coop/learning activities	3.4	1.2	09%	14%	24%	336%	17%

@Note: (5=Strongly Agree; 1 = Strongly Disagree)

aNote: Percent of respondents

Table 2

A Comparison of Perceptions About Science Textbook Quality Between Those Teachers Who Have Attended National Conferences and Those Teachers Who Have Not Attended National Conferences

Survey Items@ (listed in Methodology)	Attended National Conf. (n=29)		Did Not Attend National Conf. (n=37)			
	M	SD	M	SD	t-value	p.*
1. Appropriate coverage	3.7	1.2	3.7	1.1	0.266	.7874
2. Adequate materials	3.6	1.2	3.8	1.1	0.594	.5618
3. Congruency with state	3.1	1.4	3.4	1.1	0.928	.3714
4. Knowledge level balance	3.3	1.2	3.8	1.0	1.557	.1206
5. Appropriate age level	3.8	1.0	3.8	1.0	0.178	.8536
6. Substitute materials	3.6	1.4	3.3	1.2	0.702	.4924
7. Add or create materials	3.5	1.4	3.2	1.3	0.697	.4956
8. Provides examples	3.6	0.8	3.6	1.2	0.069	.9482
9. Critical Thinking skills	3.4	1.0	3.6	1.1	0.792	.4394
10. Student as a worker	3.1	1.1	3.3	1.2	0.564	.5818
11. Resource materials	3.5	1.1	3.7	1.0	1.098	.2762
12. Learning characteristics	3.4	0.9	3.9	0.8	2.523	.0136*
13. Appropriate Terminology	3.7	1.0	3.9	1.0	0.904	.3822
14. Excessive recall	3.1	1.0	3.2	1.2	0.184	.8492
15. Satisfaction with textbook	3.5	1.0	3.4	1.1	0.448	.6610
16. Hands-on activities	3.6	1.2	3.1	1.1	0.768	.4526
17. Coop/learning activities	3.6	1.0	3.2	1.3	1.263	.2086

@Note: Specific Items are listed in the appendix of this article (5=positive; 1 = negative)

*Two-tailed Probability $p.<.05$

Table 3

A Comparison of Perceptions Regarding Science Textbook Quality Between Those Teachers Who Have Been Involved in Team Planning and Those Who Have Not

Survey Items@ (listed in Methodology)	Team Planning (n=23)		Did not Have Team Plannning (n=43)			
	M	SD	M	SD	t-value	p.*
1. Appropriate coverage	3.9	1.1	3.6	1.1	1.146	.2548
2. Adequate materials	3.8	1.2	3.6	1.1	0.518	.6134
3. Congruency with state	3.3	1.4	3.2	1.2	0.172	.8664
4. Knowledge level balance	3.9	1.1	3.4	1.0	2.037	.0432*
5. Appropriate age level	3.9	0.9	3.7	1.1	0.815	.4266
6. Substitute materials	3.1	1.3	3.6	1.3	1.556	.1206
7. Add or create materials	3.1	1.4	3.4	1.3	0.832	.4174
8. Provides examples	3.7	1.2	3.5	1.0	0.664	.5160
9. Critical Thinking skills	3.7	1.1	3.4	1.1	1.179	.2412
10. Student as a worker	3.3	1.0	3.1	1.2	0.858	.4042
11. Resource materials	3.7	2.0	3.6	1.1	0.263	.7896
12. Learning characteristics	3.7	1.0	3.7	0.9	0.377	7088
13. Appropriate Terminology	4.0	0.9	3.7	1.1	1.318	.1892
14. Excessive recall	3.3	1.1	3.1	1.1	0.498	.6260
15. Satisfaction with textbook	3.6	1.1	3.4	1.1	0.443	.6632
16. Hands-on activities	3.6	0.9	3.5	1.2	0.114	.9038
17. Coop/learning activities	3.4	1.0	3.4	1.3	0.154	.8728

@Note: Specific Items are listed in the appendix of this article (5=positive; 1 = negative)

*Two-tailed Probability p.<.05

Table 4

A Comparison of Perceptions Regarding Science Textbook Quality Between Teachers With Undergraduate Degrees and Teachers With Advanced Degrees

Survey Items@ (listed in Methodology)	Bachelors Degree (n=32)		Advanced Degree (n=34)			
	M	SD	M	SD	t-value	p.*
1. Appropriate coverage	3.5	1.1	3.9	1.2	1.167	.2462
2. Adequate materials	3.6	1.2	3.7	1.2	0.386	.7026
3. Congruency with state	3.2	1.0	3.2	1.4	0.054	.9556
4. Knowledge level balance	3.5	1.0	3.6	1.2	0.101	.9164
5. Appropriate age level	3.8	1.1	3.8	1.0	0.199	.8374
6. Substitute materials	3.5	1.2	3.4	1.4	0.456	.6546
7. Add or create materials	3.4	1.2	3.2	1.4	0.516	.6138
8. Provides examples	3.4	1.2	3.7	1.0	1.257	.2051
9. Critical Thinking skills	3.1	1.2	3.7	0.9	0.925	.3724
10. Student as a worker	3.3	1.1	3.2	1.2	0.157	.8704
11. Resource materials	3.5	1.1	3.7	1.0	0.805	.4320
12. Learning characteristics	3.7	.90	3.7	0.9	0.223	.8190
13. Appropriate Terminology	3.8	1.1	3.9	1.0	0.523	.6090
14. Excessive recall	3.2	1.0	3.2	1.2	0.146	.8792
15. Satisfaction with textbook	2.3	1.2	3.6	1.0	0.807	.4310
16. Hands-on activities	3.4	1.1	3.6	1.1	0.435	.6692
17. Coop/learning activities	3.3	1.2	3.4	1.2	0.231	.8130

@Note: Specific Items are listed in the appendix of this article (5=positive; 1 = negative)

*Two-tailed Probability p.<.05

Table 5

A Comparison of Years Teaching Experience and Teachers' Perceptions about Science Textbook Quality

Survey Items	Teaching Experience 1-4 Yrs (n=23)		5-10 Yrs (n=22)		11-33 Yrs (n=21)			
	M	SD	M	SD	M	SD	F-Ratio	p*
1. Appropriate coverage	3.7	1.0	3.6	1.9	3.0	1.2	0.57	.5733
2. Adequate materials	3.6	1.1	3.6	1.3	3.8	1.1	0.19	.8308
3. Congruency with state	3.6	1.1	3.3	1.1	2.9	1.5	1.23	.2978
4. Knowledge level balance	3.6	1.1	3.5	1.1	3.6	1.2	0.12	.8844
5. Appropriate age level	3.7	1.0	3.9	1.1	3.9	1.0	0.11	.8990
6. Substitute materials	3.4	1.2	3.7	1.3	3.1	1.4	0.92	.4109
7. Add or create materials	3.4	1.3	3.5	1.3	3.2	1.5	0.14	.8707
8. Provides examples	3.7	1.0	3.3	1.1	3.8	1.1	1.02	.3868
9. Critical Thinking skills	3.6	0.9	3.3	1.3	3.7	1.0	0.68	.5168
10. Student as a worker	3.5	0.9	3.0	1.5	3.2	0.9	1.02	.3691
11. Resource materials	3.5	1.0	3.6	1.1	3.7	1.1	0.19	.8302
12. Learner characteristics	3.6	0.8	3.6	1.0	3.9	0.9	0.89	.3911
13. Appropriate Terms	3.8	0.9	3.6	1.1	4.1	1.0	0.89	.4223
14. Excessive recall	3.2	0.8	3.2	1.2	3.1	1.4	0.01	.9935
15. Satisfaction with text	3.6	1.1	3.3	1.1	3.6	1.1	0.65	.5315
16. Hands-on activities	3.7	1.0	3.3	1.3	3.4	1.1	0.84	.4405
17. Coop/learning Activities	3.7	0.8	3.2	1.54	3.2	1.1	1.27	.2862

@Note: Specific Items are listed in the appendix of this article (5=positive; 1 = negative)

*$p < .05$

Table 6

A Comparison of Perceptions Regarding Science Textbook Quality Between Male and Female Science Teachers

Survey Items@ (listed in Methodology)	Male (n=24)		Female (n=42)			
	M	SD	M	SD	t-value	p.*
1. Appropriate coverage	3.3	1.4	3.9	0.9	2.037	.0432*
2. Adequate materials	3.8	1.2	3.6	1.1	0.361	.7200
3. Congruency with state	3.0	1.3	3.4	1.2	1.357	.1784
4. Knowledge level balance	3.4	1.1	3.6	1.0	0.718	.4826
5. Appropriate age level	3.8	1.1	3.8	0.9	0.161	.8674
6. Substitute materials	3.3	1.4	3.5	1.2	0.623	.5428
7. Add or create materials	3.3	1.5	3.3	1.3	0.121	.9000
8. Provides examples	3.7	1.1	3.5	1.0	0.519	.6112
9. Critical Thinking skills	3.5	1.1	3.5	1.0	0.066	.9464
10. Student as a worker	3.4	1.0	3.1	1.2	0.798	.4358
11. Resource materials	3.8	1.1	3.5	1.0	1.102	.2740
12. Learning characteristics	3.8	0.9	3.6	0.9	0.749	.4636
13. Appropriate Terminology	3.8	1.3	3.8	0.9	0.090	.9256
14. Excessive recall	3.2	1.2	3.2	1.1	0.000	.5000
15. Satisfaction with textbook	3.5	1.1	3.5	1.1	0.086	.9290
16. Hands-on activities	3.5	1.2	3.5	1.1	0.00	.5000
17. Coop/learning activities	3.4	1.1	3.4	1.3	0.195	.8406

@Note: Specific Items are listed in the appendix of this article (5=positive; 1 = negative)

*Two-tailed Probability $p.<.05$